



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

March 29, 2017

Derek J. Robinson, BRAC Environmental Coordinator
Department of the Navy
Base Realignment and Closure Program Management Office West
33000 Nixie Way, Building 50
San Diego, CA 92147

Re: EPA Comments on the Draft Remedial Design Package, Parcel E, Hunters Point Naval Shipyard, San Francisco, California, January 2017

Dear Mr. Robinson:

Attached are EPA's comments on the Draft Remedial Design Package, Parcel E, Hunters Point Naval Shipyard, San Francisco, California, January 2017.

If you have any questions, please do not hesitate to call me at (415) 972-3681 or e-mail me at huang.judy@epa.gov.

Sincerely,

A handwritten signature in black ink, reading "Judy C. Huang".

Judy C. Huang, P.E.
Remedial Project Manager

cc:

Nina Bacey, DTSC (via email)
Tina Low, RWQCB (via email)
Amy Brownell, SFDPH (via email)
Rebecca Cardoso, US Navy (via email)
Danielle Janda, US Navy (via email)

**Review of the Review of the Draft Remedial Design Package, Parcel E, Hunters Point
Naval Shipyard, San Francisco, California, January 2017***

DRAFT REMEDIAL DESIGN PACKAGE, PARCEL E

1. Details regarding numerous remedial action (RA) components and implementation procedures are not included in the Draft Remedial Design Package, Parcel E, Hunters Point Naval Shipyard, San Francisco, California, dated January 2017 (Draft RDP). Instead, these components and procedures have been deferred to other documents. As a result, it is unclear if the remedy will meet the requirements of the record of decision (ROD). The following are several examples of information that has been deferred:
 - a. Table 9 (Actions to be Addressed in Remedial Action Work Plan) of the Draft Design Basis Report for Parcel E, Hunters Point Naval Shipyard, San Francisco, California, dated January 2017 (Draft DBR) provides a list of the information that will be provided later by the RA contractor.
 - b. Section 3.3.1 (Proposed Area for Treatment) of the Draft DBR states, "The RAMP [Remedial Action Monitoring Plan], which is provided under separate cover, describes soil gas monitoring that will be performed in and around Building 406 to guide SVE system operation and verify that the source control measures are adequately mitigating the inhalation risk."
 - c. Section 3.4.3.2 (Post-Injection Monitoring) of the Draft DBR indicates that inspections for biofouling will be performed as part of the monitoring program; however, further details regarding biofouling and the inspections are not provided and/or referenced.
 - d. Section 3.4.4 (Treatment Design for IR-04 CVOC Plume) of the Draft DBR states, "The RAWP(s) [remedial action work plans] will further refine this contingency treatment action." The statement suggests that there will be multiple RAWPs but there is no clarity regarding how many RAWPs are planned.
 - e. Section 3.1.3 (Environmental Protection Measures) of the Draft DBR indicates that the RAWP will include a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Stormwater Plan, a Dust Monitoring and Control Plan, and a San Francisco Bay Water Quality Monitoring and Protection Plan.
 - f. Section 3.2.3 (Pre-Excavation Characterization Sampling) of the Draft DBR indicates that the RA contractor will develop a pre-excavation characterization sampling plan designed to refine the limits of the excavations. Section 3.2.4 (Excavation Methods) of the Draft DBR states, "The RA contractor will be required to prepare a wastewater management plan that identifies the methods and procedures for management and/or discharge of waste waters that are directly derived from construction activities."

Please revise the Draft RDP to summarize the information requested in the above, including goals and objectives for each document to provide a comprehensive remedial design package that allows for assessment of the remedy to meet the requirements of the ROD.

2. The text of the RDP indicates that some new material will be included in the Draft Final RDP (e.g., techniques to improve liquefiable soil at IR-02 Southeast), so it is

recommended that a list identifying new text, tables, figures, and appendix material be provided. Please ensure that all new material is labeled such that it can be identified easily for review.

DRAFT DESIGN BASIS REPORT, PARCEL E

GENERAL COMMENTS

1. Insufficient detail was provided regarding pre-excavation characterization sampling. Section 3.2.3 (Pre-Excavation Characterization Sampling) indicates that the contractor will develop a pre-excavation characterization sampling plan to refine the limits of the excavation. However, the Draft DBR should identify areas where uncertainties exist to provide the RA contractor with a starting point for drafting the pre-excavation characterization plan. For example, the following areas of uncertainty should be discussed and/or highlighted in the Draft DBR:
 - a. Based on Figure 10 (Excavations at Redevelopment Block EOS-1 North), Excavation Area IR02B416 was not sufficiently delineated to the east or south. Specifically, there are no sample locations that provide a delineating point of compliance to the east and south of the area. Similarly, there are no sample locations that provide a delineating point of compliance to the east of Excavation Area IR02B524.
 - b. Figure 11 (Excavations at Redevelopment Block EOS-1 South) shows that the excavation area near IR02B256 was not delineated to the east. In addition, the excavation area does not address the hotspots shown on the figure.
 - c. The excavation area near IR03SH012 on Figure 15 (Excavations at Redevelopment Block EOS-3) was not delineated to the north or east.
 - d. Based on Figure 16 (Excavations at Redevelopment Block EOS-4 North), the excavation area near IR14B026 was not delineated to the northwest or southeast. Similarly, the excavation area near IR15B027 was not delineated to the north or south.
 - e. Figure 17 (Excavations at Redevelopment Block EOS-4 Central) shows that the excavation area near IR02B355 was not sufficiently defined to the west or south.
 - f. Based on Figure 18 (Excavations at Redevelopment Block EOS-4 South), additional sampling is needed to define the excavation areas near Grid 99-1, 100, 105, 114, and 115, as these grids are only defined in one or two directions.
 - g. Figure 24 (Excavations at Redevelopment Block MU-2 South) shows that the excavation area near IR14MW10A was only delineated to the east and west.
 - h. Figure 26 (Excavations at Redevelopment Block MU-3 South) shows that excavation areas near IR04B015, IR04B030, and IR01SS350 are not delineated in any direction. In addition, Excavation Area IR12SS02 was not delineated to the south.

Please revise the text to propose pre-excavation sampling, at a very minimum, for the above mentioned excavation areas to sufficiently delineate the excavation areas.

2. The groundwater flow direction was not shown on a number of Draft DBR figures. The groundwater flow direction is an important piece of information especially on figures pertinent to groundwater contamination or light non-aqueous phase liquid (NAPL)

contamination. Also, a figure showing the groundwater contour elevations at Parcel E was not provided to support the text in Section 2.4 (Hydrogeology). Please show the groundwater flow direction on all pertinent figures for groundwater contamination and NAPL, and provide a figure that depicts the groundwater elevation contours at Parcel E.

3. Insufficient detail was provided regarding injection procedures for groundwater treatment. The text describes the number of injection points, but does not provide sufficient detail regarding important injection details such as the depth of the injection screens, whether top-down or bottom-up methods will be used, the drill rig to install the injection points, and anticipated time frames for injection. While Table 9 (Actions to be Addressed in Remedial Action Work Plan) indicates that this information will be developed and addressed in the RAWP, please revise the text pertinent to groundwater treatment to provide sufficient detail regarding injection procedures.
4. Excavation areas overlap fixed features such as rail lines on many figures showing excavation areas, but the Draft DBR does not clarify if the rail line will be excavated, or the excavation will be performed around it. Figures 30 (VOC Groundwater Concentrations and Proposed Groundwater Treatment at IR-04) and 31 (VOC Groundwater Concentrations and Proposed Groundwater Treatment at IR-12A), for example, show the excavation areas as overlapping the rail line. Please clarify the excavation procedures that will be used when the proposed excavation area overlaps a fixed feature such as rail lines.
5. The Draft DBR does not specify the need for a dewatering work plan. Per the specifications provided in Section 3.3.1.2 (Dewatering) of 31 00 00 (Earthwork) in Appendix D (Project Specifications), a dewatering work plan should be submitted for approval 15 days prior to starting earthwork. Since the need for dewatering is anticipated per Sections 3.2.4 (Excavation Methods) and 3.2.6 (Backfilling of Soil Excavations), it is unclear why the submittal of a dewatering work plan in addition to the wastewater management plan is not included in Table 9 (Actions to be Addressed in Remedial Action Work Plan). Please revise the Draft DBR to include a dewatering work plan along with a wastewater management plan for the RA contractor.
6. The basis for calculating the groundwater treatment design concentrations (GWTDC) is not viable. Based on Section 3.4.1 (Calculation of GWTDCs from Preliminary SGALs), the GWTDCs were back calculated using the U.S. Environmental Protection Agency's (USEPA's) vapor intrusion screening level (VISL) calculator which is used to identify whether groundwater concentrations can pose an indoor air risk that warrants further investigation of the vapor intrusion pathway. This approach is not an accepted use of the VISL calculator and using this approach might underestimate the risk posed by volatile organic compounds (VOCs) from indoor air. A better site-specific approach to establish GWTDCs would be to collect soil gas data from the sites and correlate it with actual groundwater concentrations. Please revise the text to propose a more defensible approach to establish GWTDCS.
7. The specifics regarding in-situ groundwater treatment are not sufficiently detailed to allow the RA contractor to design a RAWP. For example:

- a. In Section 3.4.3 (Treatment Design for Building 406 CVOC Plume), the treatment areas are not fully explained. The last paragraph of Section 3.4.3 states that a total of 85 injection points covering an area of 160 feet by 120 feet is planned around well IR36MW239A. However, Figure 29 (VOC Groundwater Concentrations and Proposed Groundwater Treatment at Building 406) shows a total of three proposed treatment areas. Also, a figure showing the proposed injection locations is not provided and/or referenced.
- b. In Section 3.4.4 (Treatment Design for IR-04 CVOC Plume), the last paragraph on Page 3-30 states that a total of 120 injection points are planned but the area is not specified. Also, a figure showing the proposed injection locations is not provided and/or referenced.
- c. In Section 3.4.5 (Treatment Design for IR-12A CVOC Plume), the last paragraph on Page 3-32 states that a total of 92 injection points are planned but the area is not specified. Also, a figure showing the proposed injection locations is not provided and/or referenced.

Please clarify the proposed treatment areas and provide a figure that shows the proposed injection locations to allow the RA contractor to develop a comprehensive RAWP.

8. The Geotechnical Analysis Report is listed as a 60% Completion Report, but it is not clear when subsequent reports including the 100% report will be submitted. Please revise the Draft DBR to include a schedule indicating when the subsequent versions of the Geotechnical Analysis Report will be provided including the final version.
9. Based on the information presented in Appendix B (Design Calculations), all the design calculations were performed in 2015. As a result, it is unclear if the calculations remain relevant. Please ensure that calculations, if necessary, are updated and represent current information.
10. Section 3 of Appendix G (NAPL Treatment Technology Evaluation and Selection for IR-03) only summarizes the evaluation of the two NAPL treatment technologies and the basis for selecting in situ solidification/stabilization (ISS). While the actual pilot test report [Draft Post-Pilot Study Site-Wide Characterization Technical Memorandum for Installation Restoration Site 03, Former Oily Waste Ponds, Parcel E, Hunters Point Naval Shipyard, San Francisco, California, dated December 2016] provides additional details regarding the pilot test, additional details from the pilot test should be provided such as the size of the pilot test, the estimated treatment volumes, and duration of pilot tests. Also, figures from the pilot tests showing the area of implementation would also be helpful to support the conclusions in the Draft DBR. Please revise Appendix G to provide additional details regarding the pilot tests for NAPL that were performed.

SPECIFIC COMMENTS

1. **Section 2.5.4, NAPL at IR-03, Pages 2-7 and 2-8:** This section does not discuss the presence of aryl phosphates in the NAPL. Since aryl phosphates are present at

percentage concentrations and are toxic, the text should acknowledge the presence of these compounds. Please revise Section 2.5.4 to provide a more complete description of the NAPL constituents, including aryl phosphates.

2. **Exhibit 1, Evaluation of Soil Gas and Groundwater Data During RA Implementation, Page 2-15:** The exhibit for the soil and soil gas process does not contain an action item that evaluates when the soil vapor extraction (SVE) treatment for source removal should be discontinued. There is a decision box provided in the flow chart to determine the next course of action based on when concentrations exceed soil gas action levels; however, the decision diagram does not describe when the SVE treatment will be discontinued. Please revise Exhibit 1 to include a decision box that describes when the SVE treatment for source removal will be deemed successful or terminated.
3. **Section 3.1.1, Site Security Fencing, Pages 3-6 and 3-7:** The existing site fencing should be scanned for radioactive contamination before it is reused, recycled, returned to the vendor, or sent to a landfill for disposal. Fencing in other areas has been found to have radioactive contamination. In addition, the text states that temporary fencing is not needed along the shoreline, but people have been observed to land boats along the Hunters Point Shoreline to mine copper from buildings or to steal tools or other equipment. Site access must be restricted as long as exposure can occur. To ensure that no one is able to access the site, perimeter fencing should be installed along or near the shoreline. Please revise the text to require scanning fencing for radioactive contamination before it is reused, recycle, returned to the vendor or disposed. In addition, please revise the text to require fencing along or near the shoreline.
4. **Section 3.1.2, Preconstruction Utility and Land Surveys, Page 3-4 and Section 3.7.2 Closure of Steam Lines (IR-45), Page 3-44:** The text in Section 3.1.2 states, "Inactive former Navy utilities, if encountered, should be removed or cut and capped in place with cement grout;" however, a specific standard operation procedure (SOP) is not provided. Similarly, Section 3.7.1 indicates that sections of the steam lines "will be permanently isolated from further use and the environment by sealing the ends with a 24-inch-long concrete plug." Yet, a specific SOP is not provided. Further, it is unclear how capping in place with cement grout is appropriate in areas where soil gas is an issue, as these inactive utilities may represent a preferential pathway. Please revise the text to specify the SOPs that will be used for cutting or capping inactive utilities and discuss how the preferential pathway concerns that could result from leaving utilities in place will be addressed.
5. **Section 3.1.4, Radiological and Nonradiological Material Handling and Storage Areas, Page 3-6:** It is unclear how RA activities will be sequenced to work with and around the radiological screening pads. Section 3.1.4 states, "Parcel E contains several areas (within IR-02 Northwest, IR-05, and IR-12) with existing radiological screening pads that have been (and in some cases continue to be) used to support remediation work at HPNS [Hunters Point Naval Shipyard]. The existing screening pads may be used to support select RA activities, but the pads will need to be properly characterized and removed to allow for other RA activities (e.g., Tier 1/Tier 2 excavation, and durable cover installation) to be completed." The sequencing of RA activities will need to work

around and with these pads, yet there is no discussion regarding them, their capacity, work sequencing, etc. Please revise the text to clearly specify the sequence of activities and provide additional information with respect to the existing radiological screening pads.

6. **Section 3.1.5, Existing Groundwater Monitoring Wells, Page 3-6 and Table 11, Groundwater Monitoring Wells:** Table 11 specifies a number of monitoring wells for destruction, but does not provide rationale explaining why these wells will be destroyed. It should be noted that these recommendations cannot be reviewed without this information. Further, the text references Drawing C1 for the location of these wells, but this drawing was not published at a scale that allows it to easily be read and does not include the location of groundwater plumes, the IR-03 ISS area, or other features that should be monitored for remedy effectiveness such as the slurry walls. In order to understand whether the recommendations for well destruction, preservation, and replacement or for new wells are appropriate, rationale for these decisions should be added to Table 11 and detailed figures depicting monitoring wells and features that require monitoring at scales that can be read should be provided. Please revise Table 11 to include the rationale for the monitoring well recommendations. In addition, please provide one or more figures or drawings that depict all of the monitoring wells and the recommended actions for the wells along with features that require monitoring such as groundwater treatment areas, contaminant plumes, the ISS area, and slurry walls.
7. **Section 3.1.6, Site Demolition, Clearing and Grubbing, Page 3-7 and Appendix C, Design Drawings, Drawing C-3, Clearing Grubbing, Demolition, and Surface Debris Removal Plan:** Section 3.1.6 states, “[S]oil stockpiles (some of which may be from an unknown source) will need to be inventoried, characterized, and removed prior to constructing the durable cover;” however, these stockpile locations are not shown on Drawing C-3. Please revise Drawing C-3 in Appendix C to show the soil stockpile locations.
8. **Section 3.2.1, Soil Excavation Extents and Volumes, Page 3-9:** The excavation depth assumptions should be clarified. The first bullet point on Page 3-9 states that the excavation depths are “generally assumed to extend 2 feet below the depth of the sample location of concern;” however, the two-foot depth assumption was decreased if results of a subsequent sample, collected within two feet below the sample depth of concern, was less than the soil action level. The text does not specify if the excavation depth will extend to the depth of the subsequent sample that was below the cleanup goals. Please revise the text to clarify if the excavation depth will extend to the depth of the less-contaminated sample or to provide the assumption(s) that will be utilized to determine excavation depth in this case.
9. **Section 3.2.1, Soil Excavation Extents and Volumes, Page 3-9:** The text states the large excavation along the IR-03 shoreline “will be extended to an estimated depth of 17 feet bgs [below ground surface],” but does not state the basis for this estimated depth. For example, it is unclear if the excavation will be extended to the surface or a foot or more into Bay Mud to ensure that contamination is not left in place. Similarly, it is unclear what will occur if the Bay Mud or surface or contaminated soil are present below

17 feet bgs. Please revise the text to specify the basis for the 17 foot excavation depth and discuss how this depth is related to the Bay Mud surface and whether contaminated soil below 17 feet bgs will be left in place.

10. **Section 3.2.1, Soil Excavation Extents and Volumes, Page 3-9 and Table 12, Excavations at Tier 1, Tier 2 and TPH Locations:** The assumptions for calculating the volumes of excavated soil was not sufficiently explained. Section 3.2.1 states, “Additional excavation will be required for sloping and benching (required to maintain the sidewall stability of excavations greater than three feet deep). The additional excavation volume (for sloping and benching) is estimated at 12,500 cubic yards, but this quantity will be refined in the RAWP.” Similarly, Table 12 provides the areas and depths of individual excavation areas. However, the assumptions for the additional excavation volumes obtained from sloping and benching excavations greater than three feet are not provided. Please revise Section 3.2.1 and Table 12 to provide the assumptions and volumes for individual areas where benching and sloping will need to be performed.

Further, it is unclear if the data from individual sample locations where contamination is not present to the full proposed excavation depth will be used to adjust the excavation depths in the vicinity of those borings. For example, according to Table 12 for EX02B122B, there are three locations where the 8.5 to 9 foot bgs sample was below action levels. It is unclear to what depth the excavation will extend in the vicinity of these samples. Please revise the text to clarify how the data in Table 12 that indicates that contamination may not extend to the full proposed excavation depth will be used.

11. **Section 3.2.2.5, IR-12 (Redevelopment Block MU-1), Page 3-11 and Appendix A, Technical Memorandum for Geotechnical Investigation and Methane Survey at Parcel E, Section 6.3, Data Summary and Resolution of Project Quality Objectives, Page 6-3:** Section 6-3 of Appendix A clearly identifies explosive risk from methane at Site IR-12, but it is unclear what actions are being undertaken to mitigate this risk beyond excavation. Section 3.2.2.5 states that additional excavation will be performed to remove the debris or contamination causing methane generation, if needed, but does not identify the measures that will be taken to protect workers from potentially explosive methane conditions, containerize and/or dispose of the debris/contamination. Please clarify the protective measures that will be used during remedial activities to mitigate the explosive risk from methane.
12. **Section 3.2.4, Excavation Methods, Pages 3-12 to 3-13:** The excavation methods explained in Section 3.2.4 are insufficiently detailed. Additional detail should be provided regarding excavation procedures such as the type of machinery and waste management procedures that will be used, including details regarding stockpiling, traffic plans, and transportation. Please revise Section 3.2.4 to provide a more detailed summary of activities and procedures.
13. **Section 3.2.5, Post-Excavation Confirmation Sampling, Page 3-13:** The requirement to collect a minimum of one confirmation sample per sidewall should be moved into the bullet point discussing sidewall confirmation sampling frequency so that this requirement is not missed. Similarly, the requirement for a minimum of one excavation floor sample

per excavation should be moved into the bullet point discussing floor sampling frequency. Please make these changes.

14. **Section 3.2.5, Post-Excavation Confirmation Sampling, Page 3-14:** The text confirmation sampling requirements should include collection of an additional excavation floor sample when a sidewall confirmation sample result collected within 2 feet of the bottom of the excavation results in extending the excavation or if the excavation is extended two times in the same direction (i.e., a 10-foot extension). Please require collection of an additional floor confirmation sample under these conditions.

Similarly, if the excavation depth is extended by two feet, an additional sidewall confirmation sample from each sidewall should be collected. Please revise the text to require collection of additional sidewall confirmation samples (one from each sidewall) if the excavation depth is extended by two feet.

15. **Section 3.2.7, Radiological Screening and Management of Soil, Sediment, and Debris, Page 3-15:** It is unclear if the RA contractor or the prime contractor will perform the radiological related excavation activities. While Section 3.2 (Excavation and Offsite Disposal of Tier 1, Tier 2, and TPH Locations) clearly identifies the activities that the RA contractor will perform, Section 3.2.7 does not clarify whether an independent contractor will be performing the radiological related excavation activities. Please clarify in the text if an independent RA contractor will be performing the radiological related excavation activities.
16. **Section 3.3.2, Extraction Wells, Page 3-18:** The spacing that will be used for the SVE wells has not been adequately explained and/or supported. While Section 3.3.2 indicates that the estimated radius of influence (ROI) for the SVE wells from the treatability study is 30 feet at an applied vacuum of 3.5 inches of mercury, the text also indicates that the actual ROI will be evaluated during startup testing to ensure that the SVE wells adequately capture the treatment area. This implies that the actual ROI may be different from the estimated ROI. Please revise Section 3.3.2 to explain how the expected variability in ROI will be addressed to ensure coverage of the entire area requiring SVE.
17. **Section 3.3.2, Excavation Wells, Page 3-18:** Section 3.3.2 indicates that performance of the SVE system may need to be reevaluated to identify whether an additional means of passively introducing air to the subsurface is required to optimize system operation; however, details regarding this reevaluation are not provided. The triggers for this reevaluation should be discussed in the Draft DBR. Please revise the text to discuss the triggers for reevaluating the SVE system and provide specific details about this reevaluation.
18. **Section 3.3.4, Treatment System Equipment, Page 3-21:** The last sentence on Page 3-21 states that the preliminary design maximum system flow rates and contaminant loading indicates breakthrough from the second granular activated carbon (GAC) unit at approximately 39 days of continuous operation; however, the calculations used to estimate the breakthrough have not been provided. Please provide the calculations to support the estimate for GAC breakthrough.

19. **Section 3.3.4, Treatment System Equipment, Page 3-21:** Monitoring information for the treatment system is not provided and/or referenced. Specifically, the monitoring frequency for the SVE wells and the granular activated carbon (GAC) vessels are not specified. Please revise Section 3.3.4 to specify the monitoring frequency and protocols for the SVE treatment system.
20. **Section 3.3.5, Soil Gas Monitoring Probe, Page 3-23:** The text indicates that the soil gas monitoring probes (GMP) will be constructed of 2-inch Schedule 40 PVC pipe; however, Drawing C5 (SVE Well and Soil Gas Monitoring Probe Details) of Appendix C (Design Drawings) shows the GMP as 0.5-inch Schedule 40 PVC. Please revise Section 3.3.5 and Drawing C5 of Appendix C to address this discrepancy.
21. **Section 3.3.5, Soil Gas Monitoring Probe, Page 3-23:** The monitoring frequency and sampling protocols for the GMPs are not specified. In addition, Section 3.3.5 states, “[T]he RAWP may propose additional GMPs if needed to monitor additional locations surrounding Building 406;” however, the decision criteria that will be used to determine that additional locations are needed are not provided and/or referenced. Please revise Section 3.3.5 to specify the monitoring frequency and sampling protocols for the GMPs. In addition, please revise Section 3.3.5 to provide the decision criteria that will be used to determine that additional locations are needed.
22. **Section 3.3.5, Soil Gas Monitoring Probe, Pages 3-23 and 3-24:** The text states that “field adjustments [may] eliminate a given shallow GMP if it is screened only within low permeability soil,” but care should be taken to ensure that sufficient shallow GMPs are installed. Further, the text in Section 3.3 (SVE at Building 406) describe the locations where SVE is needed, stating “the highest VOC concentrations within lower permeability soil layers that would likely limit the ability of SVE to remove VOCs from vadose-zone soil.” Since the highest concentrations are present in low-permeability soil layers, it will be important to monitor these areas and not just monitor higher permeability zones. Please revise the text to clarify that it is critical to monitor lower permeability zones where the highest concentrations are present and that shallow GMPs should only be eliminated where high concentrations are not present.
23. **Section 3.4.4, Treatment Design for IR-04 CVOC Plume, Pages 3-30 and 3-31 and Figure 30, Groundwater Concentrations and Proposed Groundwater Treatment at IR-04:** Two additional monitoring wells are not sufficient to delineate the current extent of contamination because the proposed wells are approximately 100 feet apart. At least one additional well should be installed along the railroad tracks in the vicinity of former boring IR04B065, which was the location with the highest concentration of TCE. Please revise the treatment design and Figure 30 to include an additional groundwater monitoring well in the vicinity of former boring IR04B065.
24. **Section 3.4.6, Treatment Design for IR-12B Benzene Plume, Pages 3-33 and 3-34:** The design for the IR-12B benzene plume does not include the potential that treatment will be necessary. The text states that groundwater monitoring data will be used “to support a transition to MNA [monitored natural attenuation] or a no further action

determination.” However, data from the new wells may indicate a need for treatment. Please revise the text to include the potential need to treat benzene in the IR-12B benzene plume

25. **Section 3.5, Groundwater Controls at IR-02 Northwest, Page 3-34:** The text in Section 3.4 states, “Groundwater quality (as well as flow direction) will be monitored to ensure that contamination is not discharged into San Francisco Bay at concentrations greater than the corresponding surface water quality criteria for aquatic wildlife;” however, the text does not specify how this will be performed during the RA. Please revise the text to clarify how the monitoring for contamination along the San Francisco Bay will be performed.
26. **Section 3.5.2.1, Wall Lengths, Page 3-35:** Section 3.5.2.1 indicates that a slurry wall overlap of approximately 20 feet is proposed; however, information is not provided and/or referenced to support this overlap. The basis for the 20 feet overlap should be specified in the Draft DBR. Further, it is unclear if the overlap was included in the groundwater modeling, referenced in Section 3.5.2.3 (Wall Thickness), which was conducted to evaluate the slurry wall. Please revise the text to provide information that supports the proposed 20 feet overlap of slurry wall.
27. **Section 3.5.2.3, Wall Thickness, Page 3-36:** Section 3.5.2.3 states that, “Groundwater modeling was performed to evaluate the anticipated mound heights and hydraulic gradients associated with the wall under typical groundwater conditions;” however, the groundwater modeling details and results are not provided and/or referenced. Please revise Section 3.5.2.3 to provide or reference details about the groundwater modeling and the model results.
28. **Section 3.5.2.3, Wall Thickness, Page 3-37:** The text refers to potential corrective action to maintain the function of the slurry wall, but it is unclear where this corrective action is discussed. The DBR should include details about the type(s) of corrective action that would be necessary should the groundwater mound height near 6 inches below the top elevation of the wall. For example, one potential corrective action would be pumping groundwater from the upgradient side of the slurry wall, but Drawing C7 does not include sufficient monitoring/extraction wells to monitor potential mounding or to draw down a groundwater mound. Please revise the DBR to specify the corrective action(s) that would be taken in this case and provide details about the components required to monitor groundwater levels upgradient of the wall and to lower the height of a groundwater mound, if it forms.
29. **Section 3.5.3, Slurry Wall Mix, Page 3-37:** The text in Section 3.5.3 states, “To prevent deformation, the target compressive strength of the slurry wall is a minimum of 30 pounds per square inch;” however, information and calculations to support this value are not provided and/or referenced. Similarly, the target permeability is estimated at 10^{-5} centimeters per second, but the basis for this value is not provided. Please revise the Draft DBR to provide the calculations and assumptions used to estimate the minimum pressure and target permeability of the slurry wall.

30. **Section 3.5.4, Constructability Considerations, Page 3-38:** Section 3.5.4 indicates that the slurry wall will be realigned, if necessary, based on the project specifications in Appendix D (Project Specifications). However, the relevant sections of the specifications have not been cited. In addition, the text references drawing C12, which requires a Slurry Wall Implementation Plan in the notes, but this plan is not discussed in the DBR. Please revise Section 3.5.4 to cite the applicable sections of the project specifications associated with any proposed realignment of the slurry wall. Please also revise the DBR to discuss the contents of the Slurry Wall Implementation Plan.
31. **Section 3.5.5, Monitoring/Extraction Wells and Piezometers for Nearshore Slurry Wall, Page 3-39:** The monitoring frequency and protocols are not specified for the nearshore slurry wall. From the text in the first paragraph of Section 3.5.5, it appears that only depth-to-water measurements are planned for collection at an unknown frequency. It is not clear whether the groundwater and surface water will be sampled to ensure that the slurry wall is working as intended. Please revise Section 3.5.5 to specify the monitoring frequency and clarify whether groundwater and surface water analytical samples will be collected to confirm that the slurry wall is working as intended.
32. **Section 3.6.1, Selection of the Soil Gas Survey Locations, Page 3-41:** Section 3.6.1 states, "The soil gas sampling locations will be based on a review of historic soil data (e.g., soil samples with previous detections of organic chemicals that may volatilize into soil gas) to identify potential areas with residual VOCs in soil gas;" however, the specific decision criteria that will be used to evaluate the historic soil data are not provided and/or referenced. Please revise the text to provide the specific decision criteria that will to evaluate the historic soil data.
33. **Section 3.6.4, Future Contingency Actions, Page 3-42:** It is unclear why this section does not reference the USEPA Vapor Mitigation Guidance, OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air, OSWER Publication 9200.2-154, June 2015 (VIP Guidance). Please revise the text describing the contingency for vapor mitigation to cite the VIP Guidance.
34. **Section 3.7.2, Closure of Fuel Lines (IR-47), Pages 3-45 and 3-46 and Figure 8, Design Overview:** Section 3.7.2 indicates that Figure 8 shows the approximate locations of the fuel lines on Parcel E; however, Figure 8 does not utilize a suitable scale to show the details for the fuel line locations. Figure 8 is zoomed out to show all the site locations and plans for the site, and is not the appropriate scale to show the details for the fuel lines locations. Please revise the Draft DBR to include a separate figure that shows the relevant details for the fuel lines at a readable scale.
35. **Section 3.7.2, Closure of Fuel Lines (IR-47), Page 3-45 and Table 9, Actions to be Addressed in Remedial Action Work Plan:** The text in the partial paragraph at the top of page 3-45 discusses the need to investigate residual petroleum contamination that was not addressed when 150 feet of fuel line were removed adjacent to the D-1 boundary, but this investigation is not specified in the Closure of Steam and Fuel Lines section of Table 9. Please revise Table 9 to include the requirement to investigate this residual petroleum contamination.

36. **Section 3.8.4, In-situ Soil Solidification/Stabilization, Page 3-49 and Figure 34, NAPL Remediation Approach at IR03:** Section 3.8.4 indicates that the ISS treatment footprint for the full-scale design is shown on Figure 34, but the treatment area is not identified on Figure 34. While the extent of NAPL is shown on the figure, the figure does not specifically identify the treatment area for ISS. It appears that the text should reference Drawing C-14 instead of Figure 34. Please revise Figure 34 to identify the ISS treatment area or revise the text to reference Drawing C-14.
37. **Section 3.8.4.1, ISS Performance Criteria, Page 3-50:** The text in Section 3.8.4.1 does not specify the procedure that will be used if the tests for the unconfined compressive strengths fail. The procedures that will be used, if the average unconfined compressive strength is not above 100 pounds per square inch (psi) or the unconfined compressive strengths are below 50 psi, are not specified. Similarly, the procedures that will be used if the average hydraulic conductivity on the cured cylinders is not less than 1×10^{-6} centimeters per second (cm/sec) and the hydraulic conductivities are not below 1×10^{-5} cm/sec are not specified. Finally, it is not clear that areas with voids that contain liquid NAPL can be solidified to meet the required criteria. Please revise the text to specify the actions that will follow should the above mentioned performance criteria fail to be met. Please also revise the text to discuss how areas with voids filled with liquid NAPL will be addressed to ensure that the ISS performance criteria are met.
38. **Section 3.8.4.2, ISS Extents and Volumes, Page 3-50:** The procedures that will be used to confirm the mix percent is unclear. The target mix ratios for the cement-bentonite slurry and soil are specified, but it is unclear how the final mix-ratio will be confirmed. Please revise Section 3.8.4.2 to clarify the procedures which will confirm that the target mix ratio for the ISS is achieved.
39. **Section 3.8.4.4, Disposal of Excess Soil and Debris, Page 3-52:** Section 3.8.4.4 does not discuss the USEPA off-site rule and how it applies to materials excavated or to excess soil from Parcel E. In addition, Section 3.8.4.4 does not include sufficient provisions to ensure the receiving waste management facilities meet USEPA requirements prior to shipment offsite. Periodic verification that the receiving waste management facilities meet USEPA requirements prior to shipment offsite should be incorporated into the Draft RAWP. In addition, verbal notification should also be provided to the off-site rule expert at USEPA Region 9. Please revise the text to discuss the USEPA off-site rule with regard to meeting verification requirements for waste management facilities and notification procedures.
40. **Section 3.9.2.2, IR-03 Slurry Wall Dimensions, Page 3-54:** The Wall Thickness subsection of Section 3.9.2.2 states, "Groundwater modeling will be performed as part of the IR-03 slurry wall design to estimate the maximum hydraulic head difference across the IR-03 slurry wall to confirm that the specified wall thickness provides sufficient factors of safety against a blowout failure;" however, this sentence is confusing because groundwater modeling has presumably already been performed and presented in Appendix E (Groundwater Containment System Modeling). If additional groundwater modeling is planned, please provide additional details regarding when this modeling will

be performed and who will perform it. Please clarify if additional groundwater modeling is planned to determine hydraulic head difference and details regarding when and who will perform the groundwater modeling.

41. **Section 3.9.2.3, Soil Bentonite Backfill Mix, Page 3-55:** Details regarding the field quality control (QC) testing program for the IR-03 slurry wall is not provided. The last paragraph of Section 3.9.2.3 indicates that a field QC testing program is required by the project specification to ensure that the IR-03 slurry wall is constructed in a manner that achieves the specified performance requirements, but details regarding the field QC testing program are not specified. Please revise Section 3.9.2.3 to provide additional details regarding the field QC testing program.
42. **Section 3.9.2.4, Constructability Consideration, Page 3-55:** Section 3.9.2.4 states that, "The RA contractor will be responsible for conducting adequate pre-construction subsurface investigations to identify and locate subsurface obstructions along the entire IR-03 slurry wall alignment. The identified obstructions shall be removed by over-excavating prior to construction of the IR-03 slurry wall. If obstructions are deemed too large for removal, the IR-03 slurry wall may be realigned to avoid the obstructions;" however, it is not clear whether the proposed excavation area will be cleared for subsurface utilities prior to digging. The text does not discuss whether there is a need for utilities clearance to be performed prior to initiating digging. Please revise Section 3.9.2.4 to clarify whether subsurface utilities clearance is needed.
43. **Section 3.9.3, MNA and Performance Monitoring, Page 3-56:** Sufficient detail has not been provided regarding the monitoring frequency and laboratory analyses. The section refers to the RAMP for the details regarding monitoring, but the Draft DBR should provide a succinct summary that includes the proposed frequency of sampling and the laboratory analyses. It should be noted that the Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water, EPA/600/R-98/128, dated September 1998 (Natural Attenuation Protocol) requires an assessment of dissolved oxygen (DO), oxidation reduction potential (ORP), methane, iron, nitrate, ferrous iron, sulfate, sulfide, pH, total organic carbon, temperature, carbon dioxide, alkalinity, chloride, dissolved hydrogen, volatile fatty acids, ethane/ethene to assess if natural attenuation is occurring. Please revise Section 3.9.3 to specify the monitoring frequency and the required laboratory analyses.
44. **Section 3.9.4, In-Situ Bioremediation, Page 3-57:** The areas for potential in-situ bioremediation are not shown on a figure. The second paragraph in the section states, that in-situ bioremediation is planned as a contingency for areas outside the slurry wall. However, these areas are not shown on any figure in the Draft DBR. Please revise Figure 34 (NAPL Remediation Approach at IR-03) to identify the areas where bioremediation is being planned as a contingency.
45. **Section 3.9.4, In-Situ Bioremediation, Page 3-57:** The criteria for determining when aerobic bioremediation will be used versus when anaerobic bioremediation will be used are not specified. The last paragraph in Section 3.9.4 states that the strategy for determining which amendment to use will be based on local conditions; however, the

specific decision criteria that will be utilized should be provided and/or referenced. For example, the groundwater is predominantly anaerobic, so it is unclear what conditions could prompt the use of an aerobic remedy that would have to overcome natural background conditions. Please revise Section 3.9.4 to specify the decision criteria that will be used to determine whether an aerobic remedy or anaerobic remedy will be utilized.

46. **Section 3.10.1, Water Level Ranges, Page 3-61 and Appendix B, Design Calculations, B4, Tidal Data:** It is unclear whether current tidal data was used as the basis for design of shoreline protections (e.g., revetment). The two primary data sources per Section 3.10.1 and Calculation Sheet B4 in Appendix B are the National Ocean and Atmospheric Administration tidal data, which ranges from 1960 to 1978 and the National Geodetic Survey which has data until 2012. Please revise Section 3.10.1 to clarify whether these were the most recent data available for tidal ranges.
47. **Section 3.10.2, Wind and Wave Dynamic and Appendix B, Design Calculations, B5, Fetch Distances and Wind Parameters:** It is unclear whether current wind data was used to determine wind parameters. Per Calculation Sheet B5 in Appendix B, the wind data from San Francisco International Airport ranging from 1982 to 2011 were used to develop the wind rose. Please revise Section 3.10.2 to clarify whether these were the most recent data available for determining wind parameters.
48. **Section 3.11.3, Final Radiological Survey at IR-02 and IR-03, Pages 3-75 and 3-76 and Section 3.11.4, Final Radiological Survey at Salvage Yard (within IR-12), Page 3-77:** The text should specify that the final status survey systematic and biased soil samples will be sent for off-site laboratory analysis of the radionuclides of concern (ROCs), which include cesium-137 (Cs-137), radium-226 (Ra-226), and strontium-90 [Sr-90]). It is important that final status survey samples that are used to demonstrate compliance with the remedial goals, be analyzed according to a defined Quality Assurance Project Plan (QAPP) to ensure the results are defensible and meet the data quality objectives (DQOs) for this remedial action. This should include a requirement for collecting samples being analyzed for Ra-226 by gamma spectroscopy in a sealed container and allowing for a twenty-one ingrowth time prior to analysis. For clarity, please revise these sections to indicate that final status survey samples will be sent for off-site analysis and to require a QAPP for this project.
49. **Figure 11, Excavations at Redevelopment Block EOS-1 South:** Excavation EX02B256 does not appear to include the three locations with exceedences in this area because the three red dots indicating exceedences of Tier I action levels are located northeast of the brown-shaded excavation area. Please resolve this discrepancy.
50. **Figure 21, Excavations at Redevelopment Block MU-1 Central:** There is a note for IR36B064 that indicates that Aroclor 1254 “exceeds Tier 2 Action Level,” but no excavation is proposed in this area. Also, Aroclor is misspelled. Please resolve these discrepancies.

51. **Appendix A, Technical Memorandum for Geotechnical Investigation and Methane Survey at Parcel E, Section 2.2, CPT Borings Advancement, Page 2-3; Figure 3, Soil Boring and GMP Locations, IR-02 and IR-12; and, Figure 4, Soil Boring and GMP Locations, IR-12 Southeast and IR-03:** The transects used for the cone penetrometer test (CPT) borings are unclear. Section 2.2 states that the CPT borings were installed in transect groups of two borings; however, it is difficult to distinguish which CPT borings form a pair from Figures 3 and 4. Please revise Figures 3 and 4 to show the transect lines to help distinguish the borings that were installed in pairs.
52. **Appendix B, Design Calculations, B2, In-Situ Enhanced Anaerobic Degradation, Attachment 2, IR-12 Groundwater Treatment Calculations:** The assumptions and formulas used in the calculations for amendment volumes have not been provided. For example, the assumptions for porosity, demand, and factors of safety that have been used are not provided. In addition, the basis of design concentration and distribution volumes have also not been explained. Please provide all the assumptions and formulas used to calculate the quantities of amendments and the distribution volumes.
53. **Appendix E1, Groundwater Containment System Modeling for Parcel E, Section 1, Introduction, Page 1-4:** The last paragraph on Page 1-4 states that, "The results of the modeling work presented herein represent average anticipated groundwater conditions at the site, which are defined by 5 complete years of the most recent consecutive quarterly groundwater monitoring results available for the site from 2010 through 2014;" however, the text does not explain why only data through 2014 is used. Also, it is not clear whether the model accounts for the fact that a slurry wall and a durable cover are being installed at Parcel E-2, which would impact conditions at Parcel E near the Parcel E-2 boundary. Please revise the text in Appendix E to clarify the data range that was used and whether the model accounts for the Parcel E-2 slurry wall and durable cover.
54. **Appendix E1, Groundwater Containment System Modeling for Parcel E, Section 2.2, Boundary Conditions, Page 2-4:** The text states, "Reportedly, sanitary sewer lines at the site have already been removed," but in many areas of Parcel E particularly near the shoreline (e.g., in IR-02 and IR-03), sanitary sewer lines and storm drains are still in place. As such, it is not surprising that these lines still have hydraulic influence on groundwater elevations and flow directions. Please revise the text to acknowledge that storm drains and sanitary sewers are still in place near the shoreline.
55. **Appendix H, Section 3, Results of Radiological Risk Modeling:** U.S. EPA's "Radiation Risk Assessment at CERCLA Sites: Q & A" states "The PRG calculators (U.S. EPA 2002a, 2007, 2009a), which are used to develop risk-based PRGs for radionuclides, are recommended by EPA for Superfund remedial radiation risk assessments." (Source: https://epa-prgs.ornl.gov/radionuclides/RadRiskQAWithtransmitmemo_June_13_2014.pdf) As one of multiple lines of evidence, please revise Appendix H to show results from the EPA PRG Calculators for soil, buildings, and/or surfaces where relevant. This addition would help demonstrate consistency with U.S. EPA's CERCLA approaches. The software is public and free. The human health PRG calculator is at <https://epa-prgs.ornl.gov/radionuclides/> and the ecological risk version is at <https://epa-eco.ornl.gov/radionuclides/>.
56. **Appendix H, Section 3, Results of Radiological Risk Modeling:** Page 1-1 sources including research activities at NRDL buildings and waste disposal activities at IR-02 and

IR-03. The appendix appears to only address the latter. For clarity to the reader, please explain to a reader where to find information about risk modelling related to buildings. Also please explain the future use at IR-02 and IR-03 is outdoor recreational. Please explain whether or not any occupied buildings would be constructed (e.g. bathroom, interpretive facility, etc.). If so, then please potential risk associated with indoor exposures, e.g. to radon.

57. **Appendix H, Section 3, Results of Radiological Risk Modeling:** Radiological contamination has been measured at above release criteria levels in Building 271. Parcel E requires remedial action for soil gas, which will require workers to enter Building 271 to install a Soil Vapor Extraction system. Please discuss any potential risk to these workers from radiological contamination and what measures, if necessary, will protect these workers, e.g. remediation before SVE installation.
58. **Appendix H, Section 3, Results of Radiological Risk Modeling, Page 3-1:** The description of Scenario 3 is unclear. The third bullet point states that Scenario 3, which was used to estimate radiological dose and risk, included residual radioactivity equal to the highest reported activity at Parcels E and E-2 (below the three-foot cover), and that these activity levels were associated with radiological anomalies that were previously removed. It is unclear if the statement that the activity levels were associated with radiological anomalies that were previously removed indicates that these activities were obtained from soil directly beneath or beside the anomaly, or whether the soil that exhibited these activity levels was removed. Since the results of the risk modeling show that using Scenario 3 results in a risk greater than that allowed by the National Contingency Plan (NCP) of 10E-04-10E-06, it is important to clarify what is meant by the statement that the activity levels were “associated” with radiological anomalies. Appendix H should also clarify whether these areas of elevated activity were previously removed, or are assumed to be addressed by the proposed remedial action at Parcel E and E-2. Please revise the text to clarify how the activity levels were associated with radiological anomalies and whether these areas of elevated activities have been removed.
59. **Appendix H, Section 3, Results of Radiological Risk Modeling, Page 3-2:** The text states that the results of the risk modeling indicate that the highest reported activity at Parcels E and E-2 represent an upper bound of acceptable radiological contamination that can remain below the soil cover without posing a future risk that exceeds the risk management range of 10E-06 – 10E-04, but the basis for this statement is not supported by information provided in the Appendix H Table 2, Radiological Risk Results, 3-Foot Cover. Table 2 lists a Scenario 3 (radioactivity equal to historic maximum levels below 3-foot cover) of 1.368 E-04 which exceeds the National Contingency Plan (NCP) acceptable risk range. Please revise this section to address this concern.
60. **Appendix H, Section 3, Results of Radiological Risk Modeling, Page 3-2:** The text explains that potential risk at Parcels E and E-2 can be effectively controlled by a soil cover; however, the text does not include any discussion of whether the rate of degradation of land areas at the shoreline areas has been evaluated and whether future planned development activities and whether future planned housing/building locations at Parcels E or E-2 could be impacted by the loss of shoreline which may affect the

assumptions (i.e. soil cover) of the risk modeling. Please revise Appendix H to address this concern.

61. **Appendix H, Table 1, Default and Modified RESRAD Input Parameters:** This table identifies the exposure duration used in the RESRAD modeling as six years for the child receptor. Please describe why only 6 years was selected and why this is appropriate, versus assuming a longer time such as 10, 12, or 18 years.

MINOR COMMENTS

1. **Section 3.1.1, Site Security Fencing, Page 3-3:** The first paragraph incorrectly refers to Drawing C1 (Existing Conditions) in Appendix B (Design Calculations), when it is actually in Appendix C (Design Drawings). Please revise Section 3.1.1 to provide the correct reference for design drawing location.
2. **Appendix A, Technical Memorandum for Geotechnical Investigation and Methane Survey at Parcel E, Section 6.3, Data Summary and Resolution of Project Quality Objectives, Page 6-3:** The section incorrectly refers to Section 3.2.2.4 [IR-04 (Redevelopment Block MU-3)] of the Draft DBR instead of Section 3.2.2.5 [IR-12 (Redevelopment Block MU-1)]. Please provide the correct reference for the relevant Draft DBR section.

APPENDIX H, DRAFT PRECONSTRUCTION OPERATION AND MAINTENANCE PLAN FOR PARCEL E

GENERAL COMMENTS

1. The operation and maintenance plan does not provide a discussion of sheetpile integrity testing. Section 3.10 (Shoreline Protection) of the Draft DBR on Page 3-61 indicates that the existing sheet pile seawall corroded, which indicates that integrity testing for the proposed sheetpile wall is warranted. Please revise the operation and maintenance plan to discuss integrity testing that is needed for the sheetpile wall.

SPECIFIC COMMENTS

1. **Section 2.2, SVE System, Page 2-5:** The operation and maintenance activities described in the section are confusing. The text states, "The SVE system will require regular inspection and maintenance while operational; inspections and maintenance will not be required if the system is turned off temporarily (e.g., for pulsing operations);" however, it is unclear why inspection and maintenance activities will not be necessary during pulsing, which is typically a part of SVE operations when the active system may be shut off. SVE wells are still monitored when SVE operation is not conducted during pulsing. Please specify the operation and maintenance activities that will not be performed with respect to the SVE system during pulsing mode.
2. **Section 2.5.1, Inspection of Shoreline Protection Features, Page 2-8:** No discussion of inspection following an earthquake or other natural event has been provided in Section

2.5.1. While Sections 2 (Inspection, Maintenance, and Repair) and 4.1.1 (Earthquakes) discuss emergency response procedures following an earthquake, please revise the text to provide a discussion regarding activities that will be performed in relation to the shoreline protection features should an earthquake or other natural event occur.

3. **Section 3, Reporting, Page 3-1:** Section 3 states, “Additional reporting may be necessary following significant repair of the soil cover or revetment and following inspections triggered by an earthquake or other natural event;” however, reporting should occur if repairs are made following a natural event. Please revise the text to clearly specify that reporting will be done should repairs be made following a natural event.